

1 We claim:

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3 1. In an apparatus for controlling water level in a pool, having a water level sensor adapted
4 to be immersed in the pool, a processor electrically connected with the sensor that detects
5 low water in the pool, a transmitter electrically connected with the processor for sending a
6 radio frequency signal if the processor detects the low water, a waterproof housing
7 containing the processor, the transmitter, and a battery for powering the processor and the
8 transmitter, and a remote receiver for receiving the signal from the transmitter and turning on
9 a valve to add water to the pool, the improvement comprising:

10
11 a tilt switch connected between the battery and the processor for supplying power to the
12 processor while in an on position, the tilt switch being enclosed and sealed within the
13 housing and movable between the on and off position by tilting the housing.

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15 2. The apparatus according to claim 1, wherein the tilt switch is in an off position when the
16 housing is inverted from an operational position.

17
18 3. The apparatus according to claim 1, wherein the processor has a wave filter timer that
19 turns on for a selected interval when the processor detects low water, and wherein the
20 processor further has means for delaying the transmitter from sending the signal until the
21 end of the selected interval and for causing the transmitter to send the signal at the end of
22 the selected interval only if the processor continuously detects low water during the
23 selected interval.

24
25 4. The apparatus according to claim 1, wherein a power input of the transmitter is connected
26 to an output of the processor so that the transmitter is supplied with power only when the
27 processor directs the transmitter to send the signal

28
29 5. The apparatus according to claim 1, further comprising a low battery voltage detector in
30 the housing, the low battery voltage detector being connected to the processor for
31 informing the processor if low battery voltage is detected, the processor having means for

1 encoding a low battery voltage indication into the signal being sent by transmitter that
2 indicates low water.
3

- 4 6. The apparatus according to claim 1, wherein the receiver has an overflow counter that turns
5 on for a selected interval when the receiver receives one of the signals from the
6 transmitter, the overflow counter causing the valve to remain on until the overflow counter
7 reaches a selected count, and wherein the receiver has means for resetting the overflow
8 counter prior to reaching the selected count each time that the receiver receives one of the
9 signals from the transmitter.
10

- 11 7. The apparatus according to claim 1, wherein the processor has a wave filter timer that
12 turns on for a selected interval when the processor detects low water, and wherein the
13 processor further has means for delaying the transmitter from sending the signal until the
14 end of the selected interval and for causing the transmitter to send the signal at the end of
15 the selected interval only if the processor continuously detects low water during the
16 selected interval, the signal from the transmitter being a momentary signal; and
17

18 wherein the receiver has an overflow counter that turns on for a selected interval when
19 the receiver receives the momentary signal from the transmitter, the overflow counter
20 causing the valve to remain on until the overflow counter reaches a selected count, and
21 wherein the receiver has means for resetting the overflow counter each time that it receives
22 one of the momentary signals from the transmitter.
23

- 24 8. In an apparatus for controlling water level in a pool, having a water level sensor adapted
25 to be immersed in the pool, a processor electrically connected with the sensor that detects
26 low water in the pool, a transmitter electrically connected with the processor for sending
27 a radio frequency signal if the processor detects the low water, a waterproof housing
28 containing the processor, the transmitter, and a battery for powering the processor and the
29 transmitter, and a remote receiver for receiving the signal from the transmitter and
30 turning on a valve to add water to the pool, the improvement comprising:
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1 a wave filter timer within the processor that turns on for a selected interval when the
2 processor detects low water;

3
4 wherein the processor further has means for delaying the transmitter from sending the
5 signal until the end of the selected interval and for causing the transmitter to send the
6 signal at the end of the selected interval only if the processor continuously detects low
7 water during the selected interval; and

8
9 wherein the signal sent by the transmitter is a momentary signal.

10
11 9. The apparatus according to claim 8, wherein a power input of the transmitter is connected
12 to an output of the processor so that the transmitter is supplied with power only when the
13 processor directs the transmitter to send the signal.

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15 10. The apparatus according to claim 8, further comprising a low battery voltage detector in
16 the housing, the low battery voltage detector being connected to the processor for
17 informing the processor if low battery voltage is detected, the processor having means for
18 encoding a low battery voltage indication into the signal being sent by transmitter that
19 indicates low water.

20
21 11. The apparatus according to claim 8, wherein the receiver has an overflow counter that turns
22 on for a selected interval when the receiver receives one of the signals from the
23 transmitter, the overflow counter causing the valve to remain on until the overflow counter
24 reaches a selected count, and wherein the receiver has means for resetting the overflow
25 counter prior to reaching the selected count each time that the receiver receives one of the
26 signals from the transmitter.

27
28 12. In an apparatus for controlling water level in a pool, having a water level sensor adapted
29 to be immersed in the pool, a processor electrically connected with the sensor that detects
30 low water in the pool, a transmitter electrically connected with the processor for sending a
31 radio frequency signal if the processor detects the low water, a waterproof housing

1 containing the processor, the transmitter, and a battery for powering the processor and the
2 transmitter, and a remote receiver for receiving the signal from the transmitter and turning on
3 a valve to add water to the pool, the improvement comprising:

4
5 an overfill counter in the receiver that turns on for a selected interval when the
6 receiver receives one of the signals from the transmitter, the overfill counter causing the
7 valve to remain on until the overfill counter reaches a selected count, and wherein the
8 receiver has means for resetting the overfill counter prior to reaching the selected count each
9 time that the receiver receives one of the signals from the transmitter, the signals from the
10 transmitter being momentary.

11
12 13. The apparatus according to claim 12, wherein a power input of the transmitter is
13 connected to an output of the processor so that the transmitter is supplied with power only
14 when the processor directs the transmitter to send the signal

15
16 14. The apparatus according to claim 12, further comprising a low battery voltage detector in
17 the housing, the low battery voltage detector being connected to the processor for
18 informing the processor if low battery voltage is detected, the processor having means for
19 encoding a low battery voltage indication into the signal being sent by transmitter that
20 indicates low water.

21
22 15. A method for controlling water level in a pool,

23
24 securing a water level sensor on the exterior of a waterproof housing;

25
26 mounting a processor, a transmitter, a battery, and a main power switch within the
27 housing, the main power switch being a tilt switch that is sealed within the housing and
28 inaccessible from an exterior of the housing;

29
30 placing the housing in a portion of the pool in an upright position, causing the switch
31 to close and send power to the processor;

1
2 mounting a receiver remote from the housing, the receiver being electrically
3 connected to a valve of a water supply source that leads to the pool;

4
5 sensing water level of the pool with the sensor, and if the processor detects low water
6 in the pool, causing the transmitter to send a radio frequency signal;

7
8 receiving the signal with the receiver and opening the valve to cause water from the
9 water supply source to flow into the pool; and

10
11 when it is desired to turn off the processor , tilting the housing to cause the switch to
12 open.

13
14 16. The method according to claim 15, further comprising inverting the housing and leaving
15 the housing in an inverted position to keep the power off.

16
17 17. The method according to claim 15, further comprising tilting the housing back to the
18 upright position to reset the processor.

19
20 18. The method according to claim 15, further comprising:

21
22 upon detection of low water, delaying causing the transmitter to send the signal for a
23 selected interval; and

24
25 causing the transmitter to send the signal at the end of the selected interval only if the
26 processor continuously detects low water during the selected interval.

27
28 19. The method according to claim 15, further comprising:

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30 supplying power to the transmitter from an output of the processor and only when the
31 processor directs the transmitter to send the signal.

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2 20. The method according to claim 15, further comprising:

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4 detecting voltage of the battery and informing the processor if low battery voltage is
5 detected; and

6
7 encoding a low battery voltage indication into the signal being sent by transmitter that
8 indicates low water.

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10 21. The apparatus according to claim 15, further comprising:

11
12 upon receipt of a signal from the transmitter by the receiver, turning on an overfill
13 counter and causing the valve to remain on until the overfill counter reaches a selected
14 count, and

15
16 resetting the overfill counter prior to reaching the selected count each time that the
17 receiver receives one of the signals from the transmitter.

18
19 22. A method for controlling water level in a pool,

20
21 securing a water level sensor on the exterior of a housing;

22
23 mounting a processor, a transmitter, and a battery in the housing;

24
25 placing the housing in a portion of the pool;

26
27 mounting a receiver remote from the housing, the receiver being electrically
28 connected to a valve of a water supply source that leads to the pool;

1 sensing water level of the pool with the sensor at a selected duty cycle rate and
2 communicating the information sensed to the processor, and if the processor detects low
3 water in the pool, starting a fill counter that counts to a selected number;

4
5 continuing to sense water level in the pool at the selected duty cycle rate and if the
6 processor receives information from the processor that the water level is no longer low,
7 resetting the fill counter;

8
9 if the processor is detecting low water when the counter reaches the selected count,
10 causing the transmitter to send a momentary radio frequency signal; and

11
12 receiving the signal with the receiver and opening the valve to cause water from the
13 water supply source to flow into the pool.

14
15 23. The method according to claim 22, further comprising:

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17 supplying power to the transmitter from an output of the processor and only when the
18 processor directs the transmitter to send the signal.

19
20 24. The method according to claim 22, further comprising:

21
22 detecting voltage of the battery and informing the processor if low battery voltage is
23 detected; and

24
25 encoding a low battery voltage indication into the signal being sent by transmitter that
26 indicates low water.

27
28 25. The apparatus according to claim 22, further comprising:
29

1 upon receipt of a signal from the transmitter by the receiver, turning on an overflow
2 counter and causing the valve to remain on until the overflow counter reaches a selected
3 count; and

4
5 resetting the overflow counter prior to reaching the selected count each time that the
6 receiver receives one of the signals from the transmitter.

7
8 26. A method for controlling water level in a pool,

9
10 securing a water level sensor on the exterior of a housing;

11
12 mounting a processor, a transmitter, and a battery in the housing;

13
14 placing the housing in a portion of the pool;

15
16 mounting a receiver remote from the housing, the receiver being electrically
17 connected to a valve of a water supply source that leads to the pool;

18
19 sensing water level of the pool with the sensor and communicating the information
20 sensed to the processor, and if the processor detects low water in the pool, causing the
21 transmitter to send a momentary radio frequency signal;

22
23 receiving the signal by the receiver, opening the valve to cause water from the water
24 supply source to flow into the pool;

25
26 on receipt of the signal by the receiver, turning on an overflow counter and causing the
27 valve to remain on until the overflow counter reaches a selected count, and

28
29 resetting the overflow counter prior to reaching the selected count each time that the
30 receiver receives one of the signals from the transmitter.

1
2 27. The method according to claim 26, further comprising:

3
4 supplying power to the transmitter from an output of the processor and only when the
5 processor directs the transmitter to send the signal.
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7 28. The method according to claim 26, further comprising:

8
9 detecting voltage of the battery and informing the processor if low battery voltage is
10 detected; and
11

12 encoding a low battery voltage indication into the signal being sent by transmitter that
13 indicates low water.
14

15 29. A method for controlling water level in a pool,

16
17 securing a water level sensor on the exterior of a housing;

18
19 mounting a processor, a transmitter, and a battery in the housing;

20
21 placing the housing in a portion of the pool;

22
23 mounting a receiver remote from the housing, the receiver being electrically
24 connected to a valve of a water supply source that leads to the pool;
25

26 sensing water level of the pool with the sensor and communicating the information
27 sensed to the processor, and if the processor detects low water in the pool, causing the
28 transmitter to send a momentary radio frequency signal;

29
30 receiving the signal by the receiver, opening the valve to cause water from the water
31 supply source to flow into the pool;

1
2 detecting voltage of the battery and informing the processor if low battery voltage is
3 detected; and

4
5 encoding a low battery voltage indication into the signal being sent by transmitter that
6 indicates low water.

7
8 30. The method according to claim 29, further comprising supplying power to the transmitter
9 from an output of the processor and only when the processor directs the transmitter to
10 send the signal.

11
12 31. A method for controlling water level in a pool,

13
14 securing a water level sensor on the exterior of a housing;

15
16 mounting a processor, a transmitter, and a battery in the housing;

17
18 placing the housing in a portion of the pool;

19
20 mounting a receiver remote from the housing, the receiver being electrically
21 connected to a valve of a water supply source that leads to the pool;

22
23 sensing water level of the pool with the sensor and communicating the information
24 sensed to the processor, and if the processor detects low water in the pool, supplying
25 power from the processor to the transmitter causing the transmitter to send a momentary
26 radio frequency signal, the transmitter being supplied with power only when the
27 processor directs the transmitter to send the signal; and

28
29 receiving the signal by the receiver, opening the valve to cause water from the water
30 supply source to flow into the pool.